

**REQUEST  
FOR  
CONTINUED EXAMINATION (RCE)  
TRANSMITTAL**

Subsection (b) of 35 U.S.C. § 132, effective on May 29, 2000,  
provides for continued examination of an utility or plant  
application filed on or after June 8, 1995.  
See The American Inventors Protection Act of 1999 (AIPA).

Application Number	09/632,812
Filing Date	August 4, 2000
Examiner Name	Chester T. Barry
First Named Inventor	Steven H. Coberly, et al.
Group Art Unit	1724
Attorney Docket Number	9323.00001

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application.  
**NOTE:** 37 C.F.R. § 1.114 is effective on May 29, 2000. If the above-identified application was filed prior to May 29, 2000, applicant may wish to consider filing a continued prosecution application (CPA) under 37 C.F.R. § 1.53 (d) (PTO/SB/29) instead of a RCE to be eligible for the patent term adjustment provisions of the AIPA. See Changes to Application Examination and Provisional Application Practice, Interim Rule, 65 Fed. Reg. 14865 (Mar. 20, 2000), 1233 Off. Gaz. Pat. Office 47 (Apr. 11, 2000), which established RCE practice.

1. **Submission required under 37 C.F.R. § 1.114**

- a. ☐ Previously submitted
- i. ☐ Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on \_\_\_\_\_  
(Any unentered amendment(s) referred to above will be entered).
- ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_
- iii. ☐ Other \_\_\_\_\_
- b. ☐ Enclosed
- i. ☒ Amendment/Reply including Petition for Extension of Time
- ii. ☐ Affidavit(s)/Declaration(s)
- iii. ☐ Information Disclosure Statement (IDS)
- iv. ☐ Other \_\_\_\_\_

2. **Miscellaneous**

- a. ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of \_\_\_\_\_ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(i) required)
- b. ☐ Other \_\_\_\_\_

3. **Fees**

The RCE fee under 37 C.F.R. § 1.17(e) is required by 37 C.F.R. § 1.114 when the RCE is filed.

- a. ☒ The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 19-0733

- i. ☒ RCE fee required under 37 C.F.R. § 1.17(e) 12/19/2002 5FELEKE1 00000099 190733 09632812
- ii. ☒ Extension of time fee (37 C.F.R. §§ 1.136 and 1.17) 01 FC:1801 740.00 CH
- iii. ☐ Other \_\_\_\_\_ 02 FC:1253 920.00 CH
- b. ☐ Check in the amount of \$ \_\_\_\_\_ enclosed
- c. ☐ Payment by credit card (Form PTO-2038 enclosed)

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**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED**

Name (Print /Type)	William J. Fisher	Registration No. (Attorney/Agent)	32,133
Signature	<i>William J. Fisher</i>	Date	December 18, 2002

**CERTIFICATE OF MAILING OR TRANSMISSION**

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner For Patents, Box RCE, Washington, DC 20231, or facsimile transmitted to the U.S. Patent and Trademark Office on:

Name (Print /Type)	
Signature	
Date	

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND Fees and Completed Forms to the following address: Commissioner for Patents, Box RCE, Washington, DC 20231.



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of: Steven H. Coberly, et al.

Atty. Docket No.: 9323.00001

Confirmation No. 2522

Application No.: 09/632,812

Group Art Unit: 1724

Filed: August 4, 2000

Examiner: Chester T. Barry

For: AMINE HEAT STABLE SALT REMOVAL  
FROM TYPE II ANION EXCHANGE RESIN

**RESPONSE**

Assistant Commissioner for Patents  
Washington, D.C. 20231

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Sir:

In response to the Final Office Action dated June 21, 2002, Applicants request that the Examiner consider the following remarks before examining this application. Applicants petition for a three month extension of the period for response. The Commissioner is authorized to charge the fee for the extension, together with any other fee necessary to file this RCE and consider this response, to our Deposit Account No. 19-0733.

**The Office Action**

Claims 1-12 are pending in this application. Claims 1-8 have been allowed; claims 9-12 stand rejected.

In view of the phrase "substantially all" in claims 9 and 12, claims 9-12 stand rejected under 35 U.S.C. § 112, first paragraph, for lack of written description. Claims 9-12 stand rejected under 35 U.S.C. § 251 for introducing new matter, and under 35 U.S.C. §§ 102(b) and 103 over Keller '291.

Applicants respectfully traverse these rejections. The specification as filed clearly discloses removal of substantially all heat stable anions transferred to the resin in the previous

deposition cycle, thus traversing the 35 U.S.C. § 112 rejections. On the merits, Keller '291 neither discloses nor suggests the claimed invention.

### **The Invention**

The invention of claims 9-12 is directed to a cyclic method for purifying an aqueous alkanolamine solution containing alkali metal salts of anions that form heat stable salts with alkanolamine, heat stable salts of such anions with alkanolamines, or a blend thereof. In accordance with the method, the solution is contacted with a Type II strong base anion exchange resin to transfer at least some heat stable salt anions from the solution to the resin. Then, the resin is regenerated by contacting the resin with an alkali metal hydroxide to remove from the resin "substantially all heat stable salt anions transferred to the resin in [the previous deposition cycle]." Transfer/regeneration cycles then are repeated.

Claims 9-12 require neither saturation of the resin with heat stable salt anions nor removal of all heat stable salt anions present on the resin. Indeed, the examples in the pending application illustrate that removal of substantially all anions transferred in the previous deposition cycle is possible, but that complete removal of all anions from the resin is not possible.

### **Remarks**

#### The Invention of Claims 9-12 Is Described In The Specification

The claimed invention is directed to removal of substantially all heat stable salt anions transferred to the resin in the previous deposition cycle. Example 1 summarizes the resin capacity resulting from regeneration for each of 4 cycles relevant here. For these cycles, the capacity of the resin after each transfer/regeneration cycle was 0.612 mEq/mL, 0.559 mEq/mL, 0.556 mEq/mL, and 0.589 mEq/mL. Thus, in each case, heat stable salt anions were transferred

to resin, then regenerated therefrom with sodium hydroxide solution to restore substantially the same capacity. This capacity also is significantly lower than the virgin capacity of the resin.

Applicants respectfully submit that restoration of substantially the same resin capacity after each transfer/regeneration cycle indicates that substantially all heat stable salt anions transferred to the resin in that transfer cycle were removed in the following regeneration cycle. If regeneration removed less than substantially all of the anions transferred in the previous transfer cycle, the capacity of the resin would decline from cycle to cycle. Removal by regeneration of substantially all anions transferred in the prior deposition cycle is all that is claimed; the claims are not directed to restoring resin capacity to that of new resin.

Therefore, Applicants respectfully traverse this rejection and submit that the "substantially all" limitation is described unambiguously in the specification as filed.

Claims 9-12 Do Not Introduce New Matter To The Application

In support of the new matter rejection, it is stated that Applicants have argued that "the 'substantially equal' capacity of the resin resulting from the multiple cycles of regeneration is tantamount to removal of substantially all heat stable salt anions." Inasmuch as the quoted statement is at best ambiguous and at worst misleading, Applicants submit the following clarification. Applicants have argued (and again argue in this Preliminary Statement) that the substantially equal capacity of the resin resulting from each regeneration indicates that each regeneration is removing from the resin substantially all of the heat stable salt anions transferred during the previous deposition cycle. Applicants have never argued that substantially all heat stable salt anions are removed from the resin to restore the original resin capacity. However, Applicants do argue that the invention claimed in the rejected claims is fully disclosed in the specification as filed.

Applicants respectfully submit that the proposed analogy regarding lead in one's gasoline tank is not analogous to the claimed invention. The analogy assumes that the claims are directed to removal of all heat stable salt anions present on the resin to restore original capacity. Thus, the conclusion ("one cannot say [that] one has removed substantially all of the lead from the gas tank") does not parallel the claimed invention. Applicants respectfully submit that a better analogy to the claimed invention is that the invention is directed to removal of that quantity of lead added in each of the half-tank additions. Clearly, this occurs in the gasoline tank analogy and is parallel with the claimed invention (removes from the resin substantially all heat stable salt anions transferred to the resin in the previous deposition).

Claims 9-12 do not require removal of all heat stable anions from the resin to restore 'as new' capacity. Rather, claims 9-12 are directed to deposition of some quantity of heat stable salt anions, and removal during each regeneration of substantially all of that quantity of heat stable anions transferred during the previous absorption cycle.

Keller '291 Neither Suggests Nor Discloses The Invention Of The Claims 9-12

The comments in the office action relating to the level of discernment required of a skilled practitioner regarding argument relating to the '40% alkanolamine concentration' limitation notwithstanding, Keller '291 simply does not suggest or disclose the claimed invention. The concentration calculation is merely a calculation that requires neither great insight nor retrospective energy. Applicants respectfully submit that the outstanding rejection requires an insight that no ordinary practitioner, not even one who could determine the alkanolamine concentration, could muster, inasmuch as not even a suggestion of the claimed invention appears in Keller '291.

Keller '291 is directed to a method for removing heat stable salt anions from alkanolamine solution treated with alkali metal hydroxide. The alkali metal hydroxide reacts with the alkanolamine contaminated with heat stable salt anions, releasing the alkanolamine and forming the sodium salts of the heat stable salt anions. Thus-treated solution then is introduced to strong base anion exchange resin, where the heat stable salt anions are exchanged for hydroxide on the resin. The solution then is introduced to acidic cation exchange resin to remove the sodium cations, after which the solution is returned to the gas treatment system.

Keller '291 further discloses regeneration of the strong base anion exchange resin with alkali metal hydroxide and of the cation exchange resin with hydrochloric acid. Keller '291 exemplifies regeneration only with Type I resin. Regeneration of a Type II resin is not exemplified. Only two lines of the specification of Keller '291 are devoted to disclosure of a Type II resin.

Even though Keller '291 discloses regeneration "until the heat stable salt anions in the anion exchanger have been replaced with hydroxide ions" (column 4, lines 29-31), Keller '291 apparently did not realize that the strong base anion exchange resin used in accordance with his invention was experiencing an irretrievable loss of activity. Perhaps this loss of capacity went unnoticed because only 3 cycles were carried out; perhaps it was because Keller '291 made no capacity determinations. For whatever reason, the information is not stated *in haec verba* in Keller '291, but it is clear nonetheless.

In the sole example, Keller '291 did not determine the capacity of the Type I resin after the two 'equilibrating' runs described at column 6, lines 13 - 20, and carried out only one run thereafter. Only after that run did Keller '291 determine a resin capacity. That capacity (7.9 kEq/cu.ft., found at column 6, lines 55-56) is equivalent to 0.28 mEq/mL. This is similar to

the 0.17 mEq/mL activity found after 5 regenerations of the Type I resin used in Example 3 of the pending application. Although the compared data are on different Type I resins, these resins have roughly comparable capacities when new, so it is not unreasonable to compare the capacities in this way. Applicants respectfully submit that this low (0.28 mEq/mL) capacity is a clear indicator that the regeneration in Keller '291 was not removing substantially all of the heat stable salt anions transferred in the previous deposition period.

Because Keller '291 did not determine resin capacity *both* before and after any of the described or exemplified runs, it is not possible to determine whether substantially all heat stable salt anions transferred in a deposition cycle were removed in the subsequent regeneration. Thus, on this basis alone, Keller '291 cannot be said to suggest or disclose the claimed invention. It also is worth noting a difference between the preparations of the two resins described in Keller '291. The anion resin was twice exhausted and regenerated "to establish an equilibrium condition" (column 6, lines 13-20), but there is no evidence that an equilibrium condition was established. In contradistinction, the cation resin was exhausted and regenerated repeatedly until equilibrium was established, as set forth at column 6, lines 27-29. The anion resin was twice cycled for the purpose of establishing equilibrium conditions, but the cation resin was cycled repeatedly until equilibrium was established. The difference in language suggests that the anion resin did not reach equilibrium in the two exhaustion/regeneration cycles.

Type I resin, which is the type exemplified in Keller '291, simply cannot be regenerated effectively of thiocyanate anions with sodium hydroxide alone. Example 3 of the pending application illustrates this fact. In Example 3, a Type I resin was repeatedly exhausted with thiocyanate and regenerated with 28 pounds sodium hydroxide per cubic foot of resin. The regeneration conditions were equal to or more favorable (i.e., used more sodium hydroxide) than

the regeneration conditions in Examples 1, 2, 4, and 5 directed to Type II resin. However, Type I resin exhibited only 17 percent of virgin capacity after 5 cycles.

The relatively small quantity of NaOH used in Keller '291 to regenerate (750 mL, or about 0.91 bed volumes, of 5% NaOH solution having 2.9 lbs NaOH/cu.ft.) is significantly lower than the quantities disclosed in the subject application. Thus, Keller '291 could not have appreciated what would have been required to practice the method of the invention herein, i.e., to remove from the resin during regeneration substantially all of the heat stable salt anions transferred during the previous transfer cycle. Keller '291 does not show a recognition that Type II resins can be treated differently from Type I resins.

The prior art also teaches away from the unfounded allegation that longer regeneration would remove more thiocyanate. In particular, Taylor, U.S. Pat. No. 2,797,188, discloses that substantially complete removal of thiocyanate transferred to Type II resin (column 5, lines 28-60) is not possible in the subsequent regeneration with sodium hydroxide. As taught by Taylor '188, regeneration of Type II resin with sodium hydroxide provided only partial removal of thiocyanate in each regeneration, as evidenced by the ever-declining activity. Thus, Taylor '188 taught that it was necessary to use sodium sulfate (or another sulfate or a selected phosphate) to substantially completely remove thiocyanate from the resin. Therefore, the assertion that continuing contact with sodium hydroxide to remove additional heat stable salt anion including thiocyanate would have been obvious is unfounded. Prior art teaches away from such an approach.

During earlier prosecution, the PTO admitted that Keller '291 does not disclose substantially complete removal by regeneration of heat stable salt anion transferred during the previous transfer period. Rather, as asserted in the Office Action, "Even if the removal step of



Keller does not necessarily remove all of the minimal amount of anions transferred to the resin, it would have been obvious to continue contacting the resin with sufficient NaOH so that substantially all of the minimal amount of anions transferred to the resin are removed.” However, Examples 2 and 4 of the application illustrate that continuing to contact the resin with sodium hydroxide does not increase removal of thiocyanate from the resin. These examples illustrate that, on the same resin under identical exhaustion conditions, there is no difference in regeneration effectiveness between regeneration with 12 pounds of sodium hydroxide per cubic foot of resin (Example 4) and 28 pounds sodium hydroxide per cubic foot (Example 2). Thus, the data in the specification show that continuing regeneration does not increase effectiveness of regeneration. Keller '291 neither suggests nor discloses the invention of the application.

#### CONCLUSION

Applicants respectfully submit that claims 9-12 are in condition for allowance, and earnestly solicit favorable action thereon.

Respectfully submitted,

Date: December 18, 2002

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